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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

FOREST INSECT INVESTIGATIONS

REPORT OF PINE BEETLE SURVEYS ON THE OCHOCO NATIONAL FOREST SEASONS OF 1941 AND 1942

By

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March 1943

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Report of Pine Beetle Surveys on the Ochoco National Forest Seasons of 1941 and 1942

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ABSTRACT

Basis

Data presented are from the eleventh (1941) and twelfth (1942) annual pine beetle surveys.

Status of Infestation

Infestation continued downward in 1940 and 1941 and showed indications of a slight increase in 1942. Losses in 1941 were the lowest since 1930. Current infestation is normal except for portions of the fringe type and part of the Snow Mountain area where a light epidemic exists. No aggressive centers are present.

Estimated Forest Losses

Season of loss	No. of Trees	Volume MBM	Board Ft. Per Acre	Percent of stand
1940	60,988	42,330	48	0.52
1941	48,392	33,810	39	0.42

Ips oregoni

Epidemic continues following recent logging.

Recommendations

(1) No direct control necessary.
(2) Sanitation-salvage on areas of high beetle hazard is desirable when conditions permit.

Introduction

The eleventh and twelfth pine beetle surveys of the ponderosa pine stands within and adjacent to the Ochoco National Forest were conducted during the period, September 26 to November 2, 1941, and September 30 to October 26, 1942, respectively. These surveys are carried on as a cooperative project between the Forest Service and the Bureau of Entomology and Plant Quarantine.

Surveys in 1941 and 1942 were largely based upon a 100 percent cruise of current beetle losses on semi-permanent, 320-acre, check plots that have been established for a number of years. Intensive records from these plots were supplemented by general observations. Twenty-six plots were cruised in 1941 and twenty in 1942. The reduction in 1942 resulted from loss of three plots through cutting and elimination of three others because of curtailed survey funds. Information obtained during the 1941 and 1942 surveys serves to complete the loss data for the seasons of 1940 and 1941 and provides preliminary information on the 1942 infestation trend.

In addition to obtaining the usual loss records, the survey crew in 1942 made a 10 percent cruise of the green stand on all cruised plots. This green stand cruise was made by the ¼-acre, random, circular plot method in conjunction with the marking of insect-killed trees. All ponderosa pines over 9.5 inches DBH on the ¼-acre plots were recorded by diameter and California risk class.

The survey crews were composed of the following men: In 1941 - F. T. Houston, M. C. O'Brien, M. W. Watson; and in 1942 - R. C. Hall, R. L. Furniss, F. T. Houston, Joe Mason. Mr. A. J. Jaenicke of the Forest Service trained and supervised the 1941 crew. Mr. R. C. Hall of the Berkeley Laboratory of the Bureau took over these duties in 1942, except for the first four days of the survey when Mr. Furniss of this office was in charge of the crew.

During both 1941 and 1942 the writer observed the general pattern of infestation over much of the forest. These general observations have been used as a guide in interpreting the intensive plot records in terms of losses for the forest as a whole.

Past Losses

Stand conditions on the Ochoco in 1930 indicated that but little infestation existed on the forest for many years prior to that time. Then the cumulative effects of adverse climatic factors began to show up in the form of markedly decreased tree growth and lowered vitality of the pine stands. As a result of this decreased host resistance and aided by a large population of pine beetles which developed in windblown timber, a quiescent pine beetle infestation rapidly developed into a tremendous epidemic that reached its greatest intensity in the season of 1932. During that year losses on check plots averaged 6.62 percent of the stand killed. Maximum losses for this one year were recorded upon two plots upon which the volume of beetle-killed pine was 11.06 and 17.56 percent respectively.

Extreme sub-zero temperatures during the winter of 1932-33 caused wide spread mortality to overwintering broods of the pine beetle and abruptly halted the upward trend of infestation. Subsequent periods of sub-zero weather during the winters of 1935-36 and 1936-37 also caused considerable brood mortality. This rapid succession of winter mortality, coupled with improved growth of the trees, caused the infestation to decline until the average percent of stand killed reached a low of 0.73 percent in 1937. A slight increase occurred in 1938 during which year the average percent of loss on the plots was 0.86 percent. This was but a temporary flare-up, for the losses dropped back to 0.73 percent in 1939. Average annual losses on the check plots is shown graphically in Figure 1.

During the period from 1931 to 1939 inclusive approximately 1,223,970,000 board feet of pine timber was killed on the forest by insects. For a detailed breakdown of this loss, refer to the three previously issued office reports covering the period 1931-37 and the individual years 1938 and 1939.

Plot Losses, 1940 - 1942

Although the average trend on the plots was downward during 1940 and 1941, conditions on individual plots varied considerably During 1940 increases occurred on eight of the 26 plots; however, the infestation on these plots lacked aggressiveness and subsided during 1941. Some increase occurred on six other plots during 1941, but the infestation did not appear to be aggressive. In 1940 plot losses averaged 0.65 percent of the stand or 77 board feet per acre, 4 percent less than in 1939. The infestation declined an additional 30 percent during 1941, when plot losses averaged only 0.46 percent of the stand or 54 board feet per acre. This marks the lowest degree of infestation since the epidemic began during 1930.

Past experience indicates that from 64 to 78 percent of the current loss was perceptible at the time of the 1942 survey. On that basis it is estimated that an increase of approximately 7 percent occurred during 1942.

Location of the 26 plots covered during the 1941 survey and the 20 plots covered during the 1942 survey are shown in Fugure 1. Individual plot data secured on these surveys are presented in Table 1.

Forest Losses, 1940 - 1942

During 1940 and 1941 infestation declined markedly over the entire forest. A normal infestation was the rule on nearly all areas. Exceptions to the rule were the Snow Mountain area and small portions of fringe type on other areas. Light epidemic conditions persisted on these areas. Infestation on the Snow Mountain area, although much reduced in scope and intensity from that existing in preceding years, continued to be the most widespread and the only threatening center on the forest. Even on this area infestation in 1940 and 1941 was not considered aggressive enough to warrant direct control measures.

Estimates of insect-caused ponderosa pine losses during 1940 and 1941 are presented by units and areas in Table 2. The intensity and distribution of these losses are shown graphically in Figure 2. No forest-wide estimates of infestation in 1942 has been made from the partial loss data now available but the indications are that a slight increase occurred.

Despite the low level of infestation during 1940 and 1941, a gross loss estimated at 76 million board feet occurred on the forest during this two-year period, see Table 2.

Ips Situation

The epidemic of Ips oregoni Eichh. which, since 1939, has been following in the wake of logging operations continued aggressive during 1941 and 1942 killing large groups of reproduction and poles.

Recommendations

Even though the infestation is now at the lowest ebb since the epidemic began in 1930, the annual insect-caused loss for the forest as a whole continues to be very large. Most of this loss is in the form of old-growth, high quality pine not replaceably by growth for many decades to come. This reduction of a vital national resource comes at a time when it can least be afforded. Although a program of sanitation-salvage logging in areas of high beetle hazard would be highly desireable, it is not recommended at this time due to conditions of the present emergency. It is advised, however, that current cutting be concentrated upon areas of high hazard insofar as possible.

Table No. 1

Ochoco Forest — Insect Caused Ponderosa Pine Losses on Virgin Check Plots

Area And Units	Check Plots: Plot	Timbered Acreage	Pine Vol. Bd. Ft. as of Jan. 1, 1940	1940 Losses: No. of Trees	Board Feet: Volume	Per Acre	% of Stand	Ratio to 1939	1941 Losses: No. of Trees	Board Feet: Volume	Per Acre	% of Stand	Ratio to 1940
MITCHELL													
Waterman	Waterman	300	3,992,355	16	14,900	50	.37	.71	28	23,210	77	.58	1.56
Antone	Spanish Peak	310	4,396,365	28	18,190	58	.41	.72	22	23,040	74	.53	1.27
Area Total		610	8,388,720	44	33,090	54	.39	.72	50	46,250	76	.55	1.40
PRINEVILLE													
Trout Creek	Aubrey	320	4,611,260	16	13,920	43	.30	.57	*10	*10,530	*33	*.23	*.76
	Stevenson	320	5,697,100	19	11,900	37	.21	.63	9	7,690	24	.14	.65
McKay Creek	Ridge	320	3,447,770	29	13,250	110	1.02	.63	**43	*33,970	*106	*.99	*2.56
	Allen Creek	320	3,917,680	17	26,340	82	.67	1.96	**17	*22,780	*71	*.58	*.86
	Dry Creek	320	2,784,860	33	26,780	83	.96	1.55	25	22,550	70	.82	.84
Mill Creek	Wildcat	320	3,476,690	39	26,030	81	.75	2.03	14	17,170	54	.50	.66
Area Total		1,920	23,935,360	153	140,220	73	.59	1.30	118	114,690	60	.48	.82
OCHOCO CREEK													
Marks Creek	Hamilton	320	4,758,315	41	39,130	122	.82	.88	16	19,000	59	.41	.49
	Ochoco Sta.	320	3,717,110	39	43,430	136	1.17	2.65	**26	*21,840	*68	*.58	*.51
Wolf Creek	Horse Heaven	320	3,385,725	26	21,990	68	.65	.73	12	11,500	36	.34	.52
Area Total		960	11,862,150	106	104,550	109	.88	1.15	54	52,340	55	.44	.50
SUMMIT PRAIRIE													
Big Summit	Black Mt.	320	3,182,970	18	12,800	40	.34	.98	6	4,540	14	.12	.35
Antler	Horse Prairie	320	3,025,450	30	13,940	44	.46	.57	23	21,430	67	.71	1.53
Paulina	Paulina Butte	320	2,620,460	4	5,560	17	.21	.49	8	11,210	35	.43	2.00
Mud Spring	760 Spring	320	5,626,750	10	12,530	39	.22	.92	11	11,600	36	.21	.93
Sunflower	Sunflower	304	3,207,320	33	13,930	46	.43	1.26	12	12,540	41	.39	.90
Area Total		1,584	18,292,660	95	58,760	37	.32	.80	60	61,320	39	.34	1.04

Table No. 1

Insect Caused Ponderosa Pine Losses on Virgin Check Plots

Area and Units	Check Plots			1940 Losses					1941 Losses				
				No. of Trees	Board Feet				No. of Trees	Board Feet			
	Plot	Timbered Acreage	Pine Vol. Bd. Ft. as of Jan. 1, 1940		Volume	Per Acre	% of Stand	Ratio to 1939		Volume	Per Acre	% of Stand	Ratio to 1940
MAURY MT.													
Maury	Klootchman	320	4,800,270	13	10,190	31	.21	.65	*7	*8,820	*28	*.18	*.90
	Double Cabin	320	3,145,700	30	23,560	74	.75	.62	28	24,380	76	.78	1.03
	RimRock	320	3,886,165	29	23,450	73	.60	1.62	11	*14,010	*44	*.36	*.60
Area Total		960	11,832,135	72	57,200	60	.48	.84	46	47,210	49	.40	.83
SNOW MOUNTAIN													
Allison	Thorne Mill	315	5,525,820	9	12,810	41	.23	.71	2	4,280	14	.08	.33
	Soda Spring	285	2,608,925	64	54,310	190	2.08	1.40	24	17,200	60	.67	.32
	Bixby Spring	290	2,805,455	39	23,100	80	.82	.59	19	14,940	52	.54	.65
Emigrant Cr.	Bear Butte	300	3,062,320	47	29,670	99	.97	.50	23	15,330	51	.51	.52
Doe Spring	Nicoll Cr.	320	3,221,250	88	55,160	172	1.71	1.37	38	37,580	117	1.19	.68
Bald Butte	Green Butte	280	2,252,675	27	20,950	75	.93	.78	21	16,230	58	.73	.77
Bald Butte	Emigrant Butte	300	2,693,415	77	41,100	137	1.53	.81	22	10,900	36	.41	.27
Area Total		2,090	22,169,860	351	237,100	114	1.07	.87	169	116,460	56	.53	.49
FOREST TOTAL		8,124	96,480,885	821	630,920	77	.65	.96	497	438,270	54	.46	.70

* Plot not cruised in 1942. Estimate of total loss based on that portion of seasons loss marked on survey of 1941.
** Plot cut over in 1942. " " " " " " " " " " " " " " " " " "

Table No. 2

Ochoco — Insect Caused Ponderosa Pine Mortality

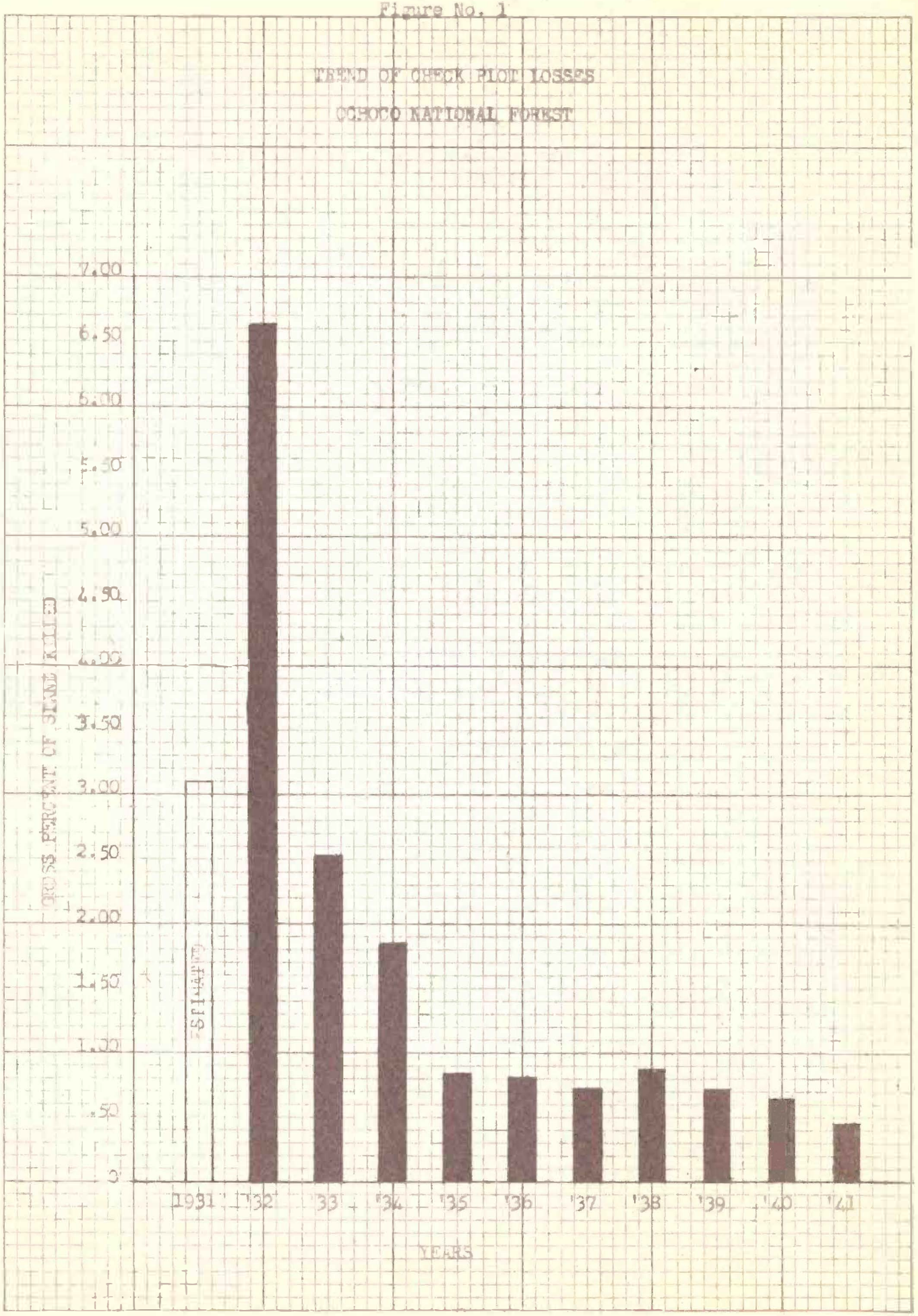
Area and Unit	Pine Type Acres: Virgin	Pine Type Acres: Cutover	Pine Type Acres: Total	Total Volume M. B. M. Jan. 1, 1940	Estimated 1940 Loss: Trees	Estimated 1940 Loss: Volume M.B.M.	Estimated 1940 Loss: Trees Per Sec.	Estimated 1940 Loss: Bd.Ft. Per Acre	Estimated 1940 Loss: Percent of Stand	Estimated 1941 Loss: Trees	Estimated 1941 Loss: Volume M.B.M.	Estimated 1941 Loss: Trees Per Sec.	Estimated 1941 Loss: Bd.Ft. Per Acre	Estimated 1941 Loss: Percent of Stand
MITCHELL														
Waterman	40,700	1,300	42,000	321,500	2,500	1,680	38	40	.52	2,430	1,640	37	39	.51
Mitchell	21,500	500	22,000	173,000	1,270	890	37	40	.51	1,100	770	32	35	.44
Badger	23,800	2,200	26,000	351,200	1,625	1,170	40	45	.33	1,500	1,080	37	49	.31
Antone	29,000	3,000	32,000	241,500	1,700	1,190	34	37	.49	1,600	1,120	32	35	.47
Area Total	115,000	7,000	122,000	1,087,200	7,095	4,930	37	40	.46	6,630	4,610	35	38	.43
PRINEVILLE														
Trout Creek	51,000	500	51,500	606,000	2,251	1,560	28	30	.26	1,908	1,330	24	26	.22
McKay Creek	44,550	17,950	62,500	575,200	2,940	2,280	30	47	.51	2,740	2,120	28	44	.48
Mill Creek	33,000	1,000	34,000	300,000	1,965	1,370	37	40	.46	1,755	1,230	33	36	.41
Area Total	128,550	19,450	148,000	1,481,200	7,156	5,210	31	35	.35	6,403	4,680	28	32	.32
OCHOCO CREEK														
Marks Creek	59,400	9,100	68,500	800,800	5,200	4,200	49	61	.52	3,875	3,200	36	47	.40
Wolf Creek	62,400	6,100	68,500	685,000	5,032	4,100	47	60	.60	3,680	3,000	34	44	.44
Area Total	121,800	15,200	137,000	1,485,800	10,232	8,300	48	61	.56	7,525	6,200	35	45	.42
SUMMIT PRAIRIE														
Big Summit	70,000	—	70,000	775,000	1,310	920	12	13	.12	1,140	800	10	11	.10
Antler	41,500	—	41,500	466,000	2,100	1,520	32	37	.33	2,200	1,600	34	39	.34
Paulina	37,500	—	37,500	340,000	1,545	1,120	26	30	.33	1,655	1,200	28	32	.35
Mud Spring	18,500	—	18,500	174,000	1,000	700	35	38	.40	961	680	33	37	.39
Sunflower	25,500	—	25,500	186,000	2,000	1,000	50	39	.54	1,750	870	44	34	.47
Area Total	193,000	—	193,000	1,941,000	7,955	5,260	26	27	.26	7,706	5,150	25	27	.27

Table No. 2

Ochoco — Insect Caused Ponderosa Pine Mortality

Area and Unit	Pine Type				Estimated 1940 Loss					Estimated 1941 Loss				
	Acres			Total Volume M. B. M.										
	Virgin	Cutover	Total	Jan. 1, 1940	Trees	Volume M.B.M.	Trees Per Sec.	Bd.Ft. Per Acre	% of Stand	Trees	Volume M.B.M.	Trees Per Sec.	Bd.Ft. Per Acre	% of Stand
MAURY MT.														
Maury	54,200	800	55,000	445,800	3,260	2,370	38	43	.53	3,035	2,200	35	40	.49
SNOW MOUNTAIN														
Doe Spring	31,000	—	31,000	331,400	4,300	2,580	89	83	.78	3,583	2,150	74	70	.65
Allison	65,000	—	65,000	586,800	5,820	4,380	57	67	.75	3,900	2,920	38	45	.50
Emigrant	63,000	—	63,000	463,700	7,700	5,000	78	79	1.08	4,750	3,080	48	49	.66
Bald Butte	57,800	2,200	60,000	445,300	7,470	4,300	80	72	.97	4,860	2,820	52	47	.63
Area Total	216,800	2,200	219,000	1,827,200	25,290	16,260	74	74	.89	17,093	10,970	50	50	.60
FOREST TOTAL	813,510	60,490	874,000	8,110,300	60,988	42,330	45	48	.52	48,392	33,810	35	39	.42

Figure No. 1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OCHOCO NATIONAL FOREST
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SILVICULTURE
1931
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'39
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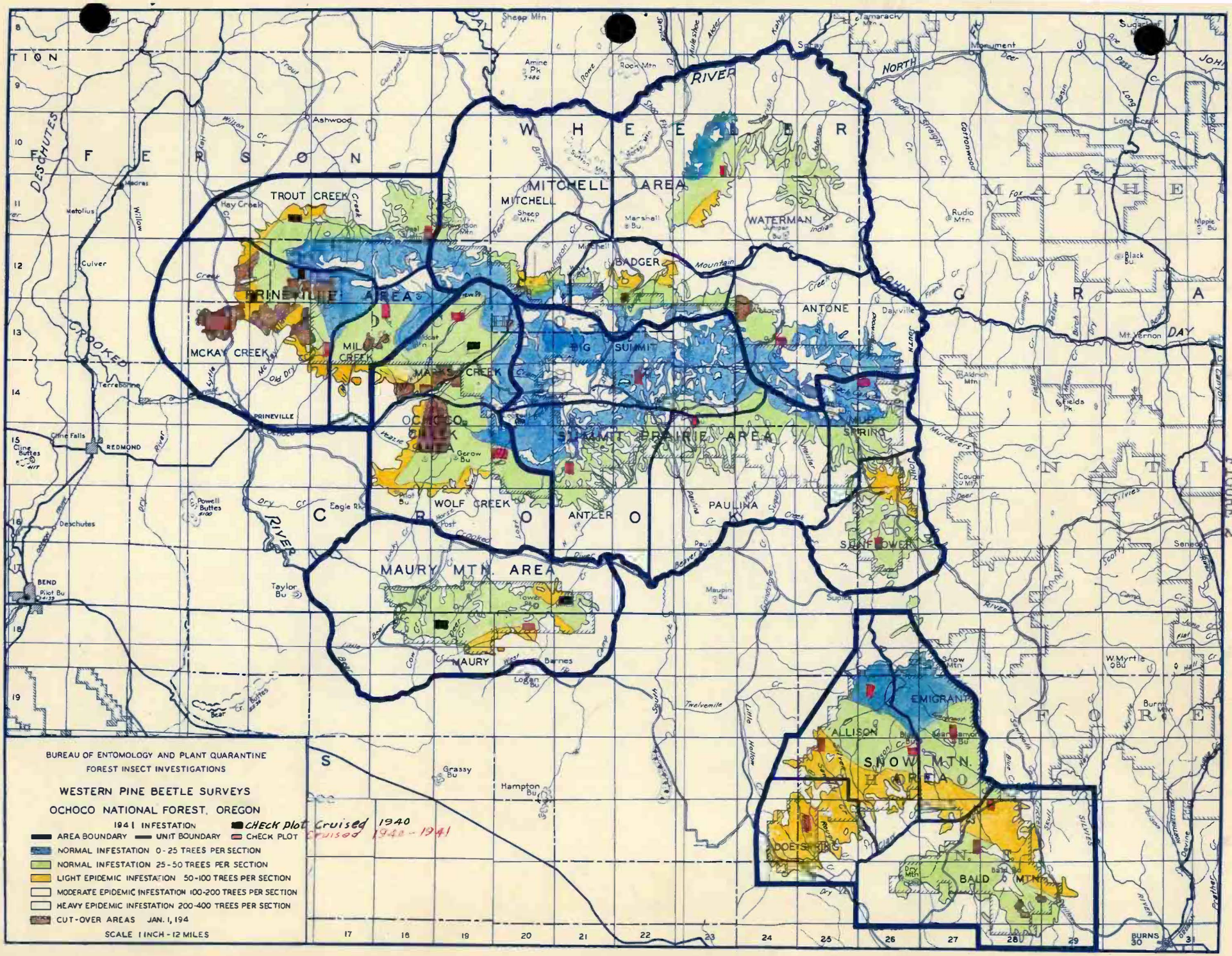
YEARS


BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
FOREST INSECT INVESTIGATIONS
WESTERN PINE BEETLE SURVEYS
OCHOCO NATIONAL FOREST, OREGON
1941 INFESTATION
AREA BOUNDARY
UNIT BOUNDARY
CHECK PLOT
CHECK Plot Cruised 1940
Cruised 1940 - 1941
NORMAL INFESTATION 0-25 TREES PER SECTION
NORMAL INFESTATION 25-50 TREES PER SECTION
LIGHT EPIDEMIC INFESTATION 50-100 TREES PER SECTION
MODERATE EPIDEMIC INFESTATION 100-200 TREES PER SECTION
HEAVY EPIDEMIC INFESTATION 200-400 TREES PER SECTION
CUT-OVER AREAS JAN. 1, 194
SCALE 1 INCH - 12 MILES
TROUT CREEK
MITCHELL
MITCHELL AREA
WATERMAN
BADGER
PRINEVILLE AREA
ANTONE
MCKAY CREEK
MILL CREEK
MARKS CREEK
BIG SUMMIT
SUMMIT PRAIRIE AREA
OCHOCO CREEK AREA
MUD SPRING
WOLF CREEK
ANTLER
PAULINA
SUNFLOWER
MAURY MTN. AREA
EMIGRANT
ALLISON
SNOW MTN. AREA
BALD MTN.
DOETSCH RIDGE
PRINEVILLE
REDMOND
BEND
MAURY
Ashwood
Culver
Terrebonne
Powell Buttes
Grassy Bu
Hampton Bu
Taylor Bu
Barnes
Logan Bu
Maupin Bu
Tower Bu
Gerow Bu
Pilot Bu
Snow Mtn
Rudio Mtn
Aldrich Mtn
Fields Pk
Dayville
Mt. Vernon
Long Creek
Seneca
W. Myrtle
Burns
BURNS
Sheep Mtn
Rock Mtn
Amine Pk
Tamarack Mtn
Sugarloaf Mtn
Marshall Bu
Sheep Mtn
Indian Mtn
Black Bu
Nipple Bu
Cine Falls
Cine Buttes
Eagle Rk
Dry Cr
Crooked River
Deschutes River
North Fork John Day River
Middle Fork John Day River
South Fork John Day River
Wheeler
Deschutes
Jefferson
Crook
Grant
Wheeler
Gilliam
Morrow
Umatilla
Malheur
Harney
Grant
Wheeler
Gilliam
Morrow
Umatilla
Malheur
Harney
Deschutes
Jefferson
Crook